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EXAMINER

CRAIG, DWIN M

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 06/10/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/401,681

Applicant(s)

YOUNG, FREDRIC S.

Examiner

Dwin M Craig

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 March 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 12 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-11 have been presented for reconsideration in view of applicant's amended specification.

Response to Arguments

2. Applicant's arguments filed on 12 March 2003 have been fully considered. Examiners response is as follows:

2.1 Regarding Applicant's submission of formal drawings: The amended drawings filed on 12 March 2003 have been reviewed by the Examiner. The Examiner notes that the amended drawings are formal.

2.2 Regarding Applicant's response to the 35 U.S.C. 103(a) rejection of Claims 1-10 in view of Carpenter et al. U.S. Patent 5,311,601:

Applicant has argued that,

The Examiner has rejected claims 1-10 under 35 U.S.C. 103(a) over Carpenter et al. (CAR) in view of Thalhammer-Reyero (TR). The Examiner has cited CAR for disclosing a method for simulating a dynamic system with a plurality of interacting nodes in a network with a transformation of inputs and a transformation of outputs. The Examiner contended that CAR shows a measurable ratio of input transformation rate to output transformation rate, citing Col. 11, lines 34-61, and an activated state corresponding to an excess measurable ratio of input transformation rate to output transformation rate and an activated state corresponding to a deficit measurable ratio to of input to output and transient storage of a product of the input, citing Col 24, lines 1-67, Col. 25, lines 1-62 and Col. 26, lines 1-62. Thalhammer-Reyero U.S. Patent Number 5,930,154 has been cited for supposedly teaching a node having balanced state and activated states as recited in the present claims.

The Applicant respectfully traverses the rejection. The Applicant submits that the Examiner has misinterpreted the claimed invention and improperly combined references. The Applicant finds it difficult to address each of the issues point by point as raised by the Examiner, since the language extracted by the Examiner from the Applicant's claims does not appear to relate to the cited sections of the applied references. The Applicant respectfully observes that the Examiner cannot properly apply the language of the Applicant's own claims to read on the description in the prior art, since the prior art lacks any suggestion of use of any critical points relating to measurable ratios of inputs and outputs of a dynamic system, let alone a hierarchy of universal modules of object process

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descriptions. There is nothing in CAR to suggest either an excess measurable ratio or a deficit measurable ratio of input and output.

The CAR reference describes a linear filter which accounts for expected non-linearity's caused by the interaction of the inputs with other cellular factors (but not the output) in a nonlinear environment (a neural network) by providing a weighting factor for the input signal that allows downstream events (affected by the output) to be treated as linear events. In CAR, the weighting factor merely establishes the relationship between the values of an input and an output, and is thus at most a signal ratio system. There is nothing about two different types of ratios (in the context of CAR, this would evidently mean two different types of weighting factors). The CAR reference would not lead one of ordinary skill in the art to combine TR, a simulation tool kit, to arrive at the present invention.

The Examiner asserts that the *Carpenter et al.* reference is directed towards a pattern recognition system which consists of a neural network of nodes. The *Carpenter et al.* does teach a measurable ratio of input transformation to output transformation as disclosed by the formulas recited in **Col. 11 Lines 34-61** to further illuminate this recitation the Applicant is respectfully directed to **Figure 6** where the variables for the PRESYNAPTIC SIGNAL, PRESYNAPTIC TRANSMITTER and POSTSYNAPTIC ACTIVATION are disclosed. **Figure 6** illustrates the context in which the formula in **Col. 11 Lines 36, or formula (15)** is disclosed. The Examiner respectfully directs the attention of the Applicant to **Lines 38-42** in which the phrase, "*weighted signal $Z_{ij}S_i$ is distorted (transformed) both by depletion (decrease) of the presynaptic transmitter U_{ij} and by the activity level (rate) X_j of the postsynaptic cell.*" The *Carpenter et al.* reference further discloses **Col. 11 Lines 52-54**, "*...once intrafield feedback amplifies (increases) and contrast-enhances (rate of increase) the postsynaptic activity...*" and further in **Figures 9c and 9d** as referenced in **Col. 11 Line 54** the figures illustrate slopes of increasing rate and decreasing rate in each neural node in the neural network. The Examiner asserts that the language in the *Carpenter et al.* reference has been explained and has been properly applied to the language of

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the Applicant's own claims and therefore finds the Applicants arguments in regards to the *Carpenter et al.* reference to be unpersuasive.

2.3 Regarding Applicant's response to the 35 U.S.C. 103(a) rejection of Claims 1-10 in view of Thalhammer-Reyero U.S. Patent 5,930,154.

Applicant has argued that;

TR is merely a generalized simulation tool that represents itself as being able to use anything previously invented or that could be invented. The present invention might be useful in a TR system, but nothing in the TR system suggests the present invention. The present invention describes and claims a novel methodology wherein the interaction of the inputs and the outputs is controlled by two different measurable ratios (which can be, as noted in claim 2, referenced to external sources): one excess ratio and one deficit ratio.

TR, in its exemplary use of kinetic parameters, would be specifically distinguished from the present invention, since the present invention does not rely on kinetic parameters and the vast computational resources needed to realize such a simulation. The present invention employs the mechanism of critical points in a thermodynamic system. The present invention uses hierarchical state analysis for its analysis, control and simulation. Critical points simplifies simulation. By contrast, TR discloses a form of rate analysis for simulation, and rate analysis does not contemplate critical points. The Examiner has evidently misread TR Col. 13, lines 27-67 to Col. 14 lines 1-56. See for example Col. 13, lines 43-61, which specifically teaches away from the present invention.

The Examiner asserts that the Applicant's independent Claims are directed towards a generalized simulation tool that represents itself as being able to use anything previously invented or that could be invented, it is noted that not until dependent Claim 3 is the Applicant's Claims directed towards living organisms. The Examiner asserts that the *Thalhammer-Reyero* reference is directed towards simulation of biological systems (*Thalhammer-Reyero, Claim 42, Col. 13 Lines 43-48*). The Examiner asserts that biological systems are complex systems and therefore the *Thalhammer-Reyero* reference is teaching a method and system for describing and simulating a complex system and specifically to modeling and simulating a system as disclosed in Applicant's claim language. The Examiner asserts that the *Thalhammer-Reyero* reference does

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suggest the present claimed subject matter, specifically the applicants claimed subject matter is directed towards the simulation of living organisms (*see Applicant's Claim 2*) the *Thalhammer-Reyero* reference is directed towards living organisms (*Col. 3 Lines 30-36*). The Examiner asserts that the *Thalhammer-Reyero* reference does suggest and disclose the limitations of Applicant's claims and is therefore analogous art. The Examiner asserts that the *Thalhammer-Reyero* reference discloses outputs and inputs that are controlled by measurable ratios and that the *Thalhammer-Reyero* reference does in fact deal with thermodynamic variables (*Col. 13, lines 46-48*). The Examiner asserts that this is NOT teaching away from the Applicants Claim language. The Examiner asserts that the *Thalhammer-Reyero* reference as disclosed in (*Col. 15 Lines 65-67, Col. 16 Lines 1-14*) does perform a hierarchical state analysis. The Examiner asserts that the *Thalhammer-Reyero* reference does contemplate critical points (*Col. 16 Lines 28-44*), the *Thalhammer-Reyero* reference teaches the "constant steady state level" and a "normal" level both of which teach a critical point in regards to the living cells, gene mutations, DNA transcriptions, post-transcription splicing and as disclosed in Applicants Specification (*page 4*) the Applicants Claims are directed towards the human genome project which is concerned with mapping human DNA. The Examiner has found Applicant's arguments, as they pertain to the *Thalhammer-Reyero* reference, to be unpersuasive and therefore upholds the earlier 35 U.S.C. 103 rejections of Claims 1-10.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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3.1 Claim 11 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There is no support in Applicant's specification for a *hierarchical phase diagram* such that one of ordinary skill in the art without undo experimentation could make and/or use Applicant's claimed invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3.2 Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear to the Examiner exactly what is meant by the phrases; object-process description, scale invariant description, phase space, coarsest grained level of hierarchy and universal module for optimal transport.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1–2, 4, 5, 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Carpenter et al. U.S. Patent 5,311,601** in view of **Thalhammer-Reyero U.S. Patent 5,930,154**.

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4.1 As regards independent Claims 1 and 10 the *Carpenter et al.* reference discloses, a method of simulating a dynamic system Figures 17a, 17b, 18a-c 19a-c, 20a-c, 22a-c, and 23a-c, Col. 5 Lines 5-7, Col. 16 Lines 32-47, with a plurality of interacting nodes Col. 24 Lines 54-67 and Col. 25 Lines 1-13, Col. 4 Lines 4-9, Figures 1-5, 14a-b, 15a-b, 16, in a network Figures 1-5 and 16, comprising nodes, each node having at least one input Figure 2a-d, Col. 2 Lines 3-31, at least one output Figure 1, 2a-d and Col. 2 Lines 31-56, at least one transformation of inputs and at least one transformation of outputs, Figures 1-5 and Col. 22 Lines 56-67, a measurable ratio of input transformation rate to output transformation rate Col. 11 Lines 34-61, at least a first activated state corresponding to an excess measurable ratio of input to output, at least a second activated state corresponding to a deficit measurable ratio of input to output, and transient storage of a product of the input, Col. 24 Lines 1-67 and Col. 25 Lines 1-62 and Col. 26 Lines 1-62.

The *Carpenter et al.* reference does not explicitly disclose, a computer system, wherein each node of interest defining a balanced state between a first and second activated state, and a balanced state corresponding to a zero error between a measurable ratio and a pre-established balanced ratio, corresponding to a mathematical critical point in thermodynamic energy.

The *Thalhammer-Reyero* reference discloses, a computer system, Col. 1 Lines 64-67 and Col. 2 Lines 1-16 and Col. 47 Lines 4-9, wherein each node of interest defining a balanced state between a first and second activated state, and a balanced state corresponding to a zero error between a measurable ratio and a pre-established balanced ratio, corresponding to a mathematical critical point in thermodynamic energy Col. 13 Lines 27-67 and Col. 14 Lines 1-56.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to have modified the *Carpenter et al.* reference with the *Thalhammer-Reyero* reference because the additional ability to model higher level of complexity allows for a complete representation of complex systems, *see the Thalhammer-Reyero reference Col. 2 Lines 47-60.*

4.2 As regards **Claim 2**, the *Carpenter et al.* reference teaches each node of interest sensing for non-zero error between a measured value and a pre-established value, using the non-zero error as a control signal to mediate at least one of the inputs /outputs and an external process, **Figures 1-5, 8-9, Col. 11 Lines 6-61 and Col. 18 Lines 60-67 and Col. 19 Lines 1-5.**

4.3 As regards **Claim 4**, the *Carpenter et al.* reference teaches each node being representative of a non-living system **Col. 1 Lines 15-33**, and an error signal is an indication of imbalance in energy distribution **Col. 11 Lines 19-35.**

4.4 As regards **Claim 5**, the *Carpenter et al.* reference teaches pathways between first nodes to second nodes, **Figures 2a-d.**

4.5 As regards **Claims 7 and 9**, Official Notice, the concept of feedback in any simulation is well know in the art.

4.6 As regards **Claim 8**, the *Carpenter et al.* reference does not expressly disclose a critical point is selected for maximum stability of said balanced state.

The *Thalhammer-Reyero* discloses a critical point is selected for maximum stability of said balanced state, **Col. 13 Lines 61-67 and Col. 14 Lines 1-8.**

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to have modified the *Carpenter et al.* reference with the *Thalhammer-Reyero* reference because

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the additional ability to model higher level of complexity allows for a complete representation of complex systems, *see the Thalhammer-Reyero reference Col. 2 Lines 47-60.*

5. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Carpenter et al. U.S. Patent 5,311,601** in view of **Thalhammer-Reyero U.S. Patent 5,930,154** and in further view of **Bush et al. U. S. Patent 6,323,218.**

5.1 The limitations of **Claims 1 and 2** have been already been rejected by the examiner, *see examiners rejection paragraph 4.1 above.*

5.2 As regards dependent **Claim 3** the *Carpenter et al.* reference does not explicitly disclose each node representing a living organism or an error signal that provides an input to a regulating element for regulation to a condition of homeostasis.

The *Bush et al.* reference discloses living organisms, **Col. 2 Lines 38-47**, an error signal that provides an input to a regulating element for regulation to a condition of homeostasis **Col. 55 Lines 43-63.**

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to have modified the *Carpenter et al.* reference with the *Bush et al.* reference because, as described in the *Bush et al.* reference describing the homeostasis of a living system my contribute a significant factor in developing a treatment for Alzheimer's Disease and therefore is required for any useful model of cellular activity.

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6. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Carpenter et al. U.S. Patent 5,311,601** in view of **Thalhammer-Reyero U.S. Patent 5,930,154** and in further view of **Zandi et al. U.S. Patent 5,867,602**.

6.1 As regards the limitations of **Claims 1 and 2** have been already been rejected by the examiner, *see examiners rejection paragraph 4.1 above*.

6.1 As regards dependent **Claim 6** the *Carpenter et al.* reference does not explicitly disclose depicting each said four dimensional model in five orthogonal dimensions of space, time and greyscale, said greyscale representing a mapping from a second temporal dimension.

The *Zandi et al.* reference discloses depicting each said four dimensional model in five orthogonal dimensions of space, time and greyscale, said greyscale representing a mapping from a second temporal dimension **Figure 20-26 and Col. 1 Lines 35-59 and Col. 5 Lines 65-67 and Col. 6 Lines 1-3 and Col. 26 Lines 55-62**.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to have modified the *Carpenter et al.* reference with the *Zandi et al.* reference because superior lossless compression performance is improved when displaying a multi-dimensional model using the techniques disclosed in the *Zandi et al.* reference **Col. 47 Lines 35-67 and Col. 48 Lines 1-67 and Col. 49 Lines 1-44**.

7. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over as being unpatentable over **Keeler et al. U.S. Patent 5,353,207** in view of **Thalhammer-Reyero U.S. Patent 5,930,154**.

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7.1 As regards **Claim 11** the *Keeler et al.* reference discloses a computer system for simplifying analysis, synthesis, and control of a complex system (**Figures 7a, 7b, 7c, 8, Col. 1 Lines 55-68, Col. 2 Lines 1-25**), static and dynamic network topology having a plurality of interactive components (**Figures 2, 9a**), critical points of operation (**Figures 3, 4 and 12**), determining a ratio of parameters which control a system (**Figures 1, 3, 4, 15, Col. 1 Lines 10-54**) and producing an output (**Col. 3 Lines 39-69, Col. 4 Lines 1-38**).

However, the *Keeler et al.* reference does not expressly disclose phase transitions, a hierarchy of modeled objects.

The *Thalhammer-Reyero* reference discloses phase transitions (**Figures 13, 17**) and a hierarchy of modeled objects (**Figure 5, Col. 15 Lines 65-67, Col. 16 Lines 1-14**).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to have modified the *Keeler et al.* reference with the *Thalhammer-Reyero* reference because the additional ability to model higher level of complexity allows for a complete representation of complex systems, *see the Thalhammer-Reyero reference Col. 2 Lines 47-60*.

Conclusion

8. Applicants arguments have been found unpersuasive. The Examiner upholds both the new and old rejections of Claims 1-11.

8.1 Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8.2 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwin M Craig whose telephone number is 703 305-7150. The examiner can normally be reached on 9:00 - 5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on 703 305-9704. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-3900.

DMC
June 3, 2003



RUSSELL FREJD
PRIMARY EXAMINER